

12V Wire Gauge & Fuse Size Cheat Sheet

Copper wire, ABYC voltage-drop method ($CM = 10.75 \times \text{amps} \times \text{round-trip feet} \div \text{allowed volts}$) and ABYC 105 °C ampacity, outside the engine space, 1–3 conductors bundled. Each cell is the **smallest AWG that meets both** and is also protected by the suggested fuse (125% of the load, next standard size). Lengths are **one-way** (battery to device); the math doubles them for the return wire.

12 V, 3% drop: critical circuits (fridge, electronics, chargers, pumps, main feeds)

Amps	5 ft	10 ft	15 ft	20 ft	25 ft	30 ft
5 A	18	14	12	12	10	10
10 A	14	12	10	8	8	6
15 A	12	10	8	6	6	4
20 A	12	8	6	6	4	4
25 A	10	8	6	4	4	2
30 A	10	6	4	4	2	2
40 A	8	6	4	2	2	1
50 A	8	4	2	2	1	1/0
60 A	6	4	2	1	1/0	2/0
80 A	6	2	1	1/0	2/0	3/0
100 A	4	2	1/0	2/0	3/0	4/0
150 A	2	1/0	3/0	4/0	>4/0	>4/0
200 A	1/0	2/0	4/0	>4/0	>4/0	>4/0

12 V, 10% drop: non-critical circuits only (some lighting)

Amps	5 ft	10 ft	15 ft	20 ft	25 ft	30 ft
5 A	18	18	18	16	16	14
10 A	18	16	14	14	12	12
15 A	18	14	14	12	10	10
20 A	16	14	12	10	10	8
25 A	14	12	10	10	8	8
30 A	12	12	10	8	8	8
40 A	10	10	8	8	6	6
50 A	8	8	8	6	6	4
60 A	8	8	8	6	4	4
80 A	6	6	6	4	4	2
100 A	4	4	4	4	2	2
150 A	2	2	2	2	1	1
200 A	1/0	1/0	1/0	1/0	1/0	2/0

">4/0" = larger than 4/0 AWG: shorten the run, use parallel conductors per the manufacturer, or move to 24/48 V. Inside an engine space, in bigger bundles, or with lower-temperature insulation (60/75/90 °C) the ampacity is lower: use the calculator at wireyourrig.com/tools/wire-gauge/ for those cases.

Fuse size from load current

Left: pick the fuse from the load. Right: the fuse must not be bigger than the wire it protects.

Continuous load	Minimum fuse (125%)	Standard fuse	Smallest wire for that fuse*
3 A	3.75 A	5 A	18 AWG
5 A	6.25 A	7.5 A	18 AWG
8 A	10 A	10 A	18 AWG
10 A	12.5 A	15 A	18 AWG
15 A	18.75 A	20 A	18 AWG
20 A	25 A	25 A	16 AWG
25 A	31.25 A	35 A	14 AWG
30 A	37.5 A	40 A	12 AWG
40 A	50 A	50 A	10 AWG
50 A	62.5 A	70 A	8 AWG
60 A	75 A	80 A	8 AWG
80 A	100 A	100 A	6 AWG
100 A	125 A	125 A	4 AWG
120 A	150 A	150 A	4 AWG
150 A	187.5 A	200 A	2 AWG
200 A	250 A	250 A	1/0 AWG
250 A	312.5 A	350 A	3/0 AWG
300 A	375 A	400 A	4/0 AWG

AWG	Ampacity outside*	Max fuse outside*	Ampacity inside*	Max fuse inside*
18	20 A	20 A	17 A	15 A
16	25 A	25 A	21 A	20 A
14	35 A	35 A	29 A	25 A
12	45 A	40 A	38 A	35 A
10	60 A	60 A	51 A	50 A
8	80 A	80 A	68 A	60 A
6	120 A	100 A	102 A	100 A
4	160 A	150 A	136 A	125 A
2	210 A	200 A	178 A	175 A
1	245 A	225 A	208 A	200 A
1/0	285 A	250 A	242 A	225 A
2/0	330 A	300 A	280 A	250 A
3/0	385 A	350 A	327 A	300 A
4/0	445 A	400 A	378 A	350 A

* Outside / inside the engine space, ABYC 105 °C insulation, 1–3 conductors bundled. 'Smallest wire' is ampacity only: long runs need a bigger wire for voltage drop (page 1).

24 V, 3% drop (same current needs less copper at higher voltage)

Amps	5 ft	10 ft	15 ft	20 ft	25 ft	30 ft
5 A	18	18	16	14	14	12
10 A	18	14	12	12	10	10
15 A	16	12	10	10	8	8
20 A	14	12	10	8	8	6
25 A	14	10	8	8	6	6
30 A	12	10	8	6	6	4
40 A	10	8	6	6	4	4
50 A	8	8	6	4	4	2
60 A	8	6	4	4	2	2
80 A	6	6	4	2	2	1
100 A	4	4	2	2	1	1/0
150 A	2	2	1	1/0	2/0	3/0
200 A	1/0	1/0	1/0	2/0	3/0	4/0

Rules of thumb that go with these tables

- Fuse every positive wire as close to the battery as practical (ABYC/Blue Sea placement rules). The fuse protects the **wire**, not the device.
- If a charger, inverter or battery maker specifies a fuse or cable size, use theirs.
- Large LiFePO4 banks can deliver very high fault current: check the fuse's interrupt rating (AIC); a Class T main fuse is common.
- Size inverter cables from the inverter's **rated** output: $\text{amps} \approx \text{watts} \div (\text{low battery volts} \times \text{efficiency})$.
- Buy cable by its copper area and temperature rating. Some 'AWG-equivalent' automotive cable has less copper.

Safety: a planning estimate, not an engineering sign-off. DC systems can start fires. Check every result against the manufacturer's instructions and current ABYC E-11/NEC or local rules, and have a qualified installer check work you are not sure about. We are not responsible for how this sheet is used.

Sources: ABYC voltage-drop guidance (abycinc.org); Blue Sea Systems ampacity and bundling chart and DC main circuit protection; NEC Chapter 9 Table 8; Victron Energy, Wiring Unlimited. Method and calculators with full citations: wireyourrig.com.